



## **Demand for long distance travel - a fast increasing but scarcely documented travel activity. Illustrated by Danish travel behaviour and compared with the other European analyses**

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# **DEMAND FOR LONG DISTANCE TRAVEL - A FAST INCREASING BUT SCARCELY DOCUMENTED TRAVEL ACTIVITY. ILLUSTRATED BY DANISH TRAVEL BEHAVIOUR AND COMPARED WITH THE OTHER EUROPEAN ANALYSES**

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## **1. INTRODUCTION**

Long distance travel is one of the fastest increasing travel activities with a very high impact on the climate. Nevertheless the demand is scarcely documented from a transport perspective, nationally as well as internationally and policies to reduce the increase in demand are seldom addressed. This is in sharp contrast to the substantial public and private investments in infrastructure and transport modes for long distance travel by air as well as rail. The need for more research is therefore obvious.

Most of the European wide research literature is methodological as in the case of the two European Union's projects MEST (Methods for European Surveys and Travel Behaviour) carried out from 1996-99 (Axhausen, Madre, Polak, & Toint, 2003) and Kite from 2007-09 ("Kite - A Knowledge Base for Intermodal Passenger Travel in Europe," 2009).

Two cross-country databases collected by Eurostat exist, Dateline (Gomes & Santos, 2004; Madre, Kuhnimhof, Armoogum, Last, & Sender, 2007) from 2001/02 covering Switzerland and 15 member states and the continuous Tourism Demand Survey collected mandatory from the actual member states with the first broad report from 2012 based on an improved and more precisely defined protocol covering EU-28 (see <http://ec.europa.eu/eurostat/web/tourism/data/main-tables>).

A few national analyses of the development in long distance travel exist. For Norway, Sweden, Finland, Great Britain, Switzerland and France a long distance travel survey is part of the NTS. However, the British survey only includes domestic travel and Finland and France have not analysed the development in long distance travel but smaller unpublished analyses of travel behaviour exist.

The British long distance travel is comprehensive analysed and well documented in journals (Dargay & Clark, 2012). However, it only covers domestic travel. (Frändberg & Vilhelmson, 2011) has for Sweden analysed the development in long distance travel from 1995 to 2006 and discussed this in relation to the development in daily travel. Most of the rest are typically only documented in national reports, se e.g. for Norway (Vågane, Brechan, & Hjorthol, 2011).

For Germany no dedicated long distance travel survey is conducted and it is not a part of the daily NTS. (Frick & Grimm, 2014) have instead tried to collect other kind of smaller German data sources to give an outline of the development in German medium and long distance travel.

For Denmark the long distance travel survey as part of the NTS was stopped after 2000. However, Statistics Denmark has since 1997 collected the Holiday and Business Travel Survey which is the Danish version of the Tourism Demand Survey. None of these surveys have earlier been analysed and presented internationally, only yearly messages exist. Results from the the Holiday and Business Travel Survey is now available in a dissertation (Knudsen, 2015) and in (L. Christensen & Knudsen, 2015). Furthermore a dedicated long distance travel survey has been conducted in 2010-11 and documented in (L. Christensen & Knudsen, 2015). The results from these two surveys are presented in the following paper.

The daily European NTS all includes long distance travel in some way because they don't have a kilometre based threshold in the interview. Only for reporting from the surveys such thresholds are set up (50 miles for GB, 80 km for France and 100 km from several countries). However, several countries define a limit at the national border either for the interviews (GB and Spain) or for the reporting (Denmark and Finland). Germany has a maximum trip length at 1000 km (typical longest distance across the country) but accepts trips abroad up to the threshold. Furthermore, long distance travel including a longer time duration are directly (the Netherlands) or indirectly through the data collection methodology (especially Germany and France) left out of the survey which makes them an uncertain source for documentation. For more details see (Christensen et al., 2014).

On top of the mentioned national and transnational surveys and analyses a few smaller studies based on own or European databases exist. Finally, a more comprehensive literature exists about air travel. However, to the best

knowledge of the author few of these are based on survey data unveiling travel demand and have a more narrow scope on different angles to the demand for national or international air travel.

Dateline defines long distance travel from a distance threshold at 100 km crawl-fly distance one way; however with remaining methodological difficulties to consistently estimate trips made in the 100-400 km range. The Tourism Demand Survey uses a definition of infrequent journeys with overnight stay out of the daily activity area.

As it will be shown in the following section about the European studies it seems important to distinguish the shorter trips at the mid-range interval at 100 to 300 / 400 km from the longer infrequent trips with overnight stay. Some of the trips at the mid-range interval are daily or high frequent trips which are not always well reported in 1 or 3 month retrospective long-distance surveys due to e.g. response fatigue. In the one-day NTS surveys they are better reported. However, in these the infrequent business, visiting, and holiday trips are very uncertain when the survey is small. With a definition focussing on overnight stays the one-day long distance trips by air are lost.

In the following firstly, some results from the existing European surveys are presented followed by secondly a presentation of some main results from the Danish study. Finally the studies are compared and conclusions are drawn.

## **2. RESULTS FROM EUROPEAN LONG DISTANCE TRAVEL SURVEYS**

(Kuhnimhof, Collet, Armoogum, & Madre, 2009) compare as a part of the Kite project the results from Dateline with other long distance surveys. They show that the number of trips found by Dateline is much lower than the number of trips found by national surveys. This is especially the case for the trips shorter than 400 km of which much fewer are registered than in the national surveys.

For distances shorter than 400 km Dateline reports typically between 1.5 and 4 trips per person per year with the national surveys showing 5-10 journeys with Sweden having the far highest number. At these mid-range distances car is dominating with a modal share at 77-80% except for Switzerland (68%) which has a share of train rides at 24% compared to 16% for Denmark and 10-13% for the rest of the countries. Air travel is close to non-existing at the short distances.

At distances over 400 km Dateline reports 0.5-1 journey per person per year for most of the countries with Sweden as an exception with 1.4 journeys and Portugal and Greece with only 0.2 and 0.3 journeys, respectively. For Denmark 0.9 journeys longer than 400 km one-way is reported.

At these longer distances the mode share is varying much more. The geographically isolated countries Ireland, Great Britain and Greece have a share of air travel of 71-85%. For the Netherlands, Belgium, Germany, and Italy the air share is 41-44% whereas the share for most of the north and south European countries is 50-57%. France with 24% and Spain with 35% make an exception. They have a higher share of car driving than air travel (for all other countries except the Netherlands the car share is lower than the air travel share) and for France the train furthermore plays an important role with 24% of the journeys over 400 km. For the rest of the countries the share by train is less than 10% except for Switzerland (13%), Italy (12%), and Germany (10%),

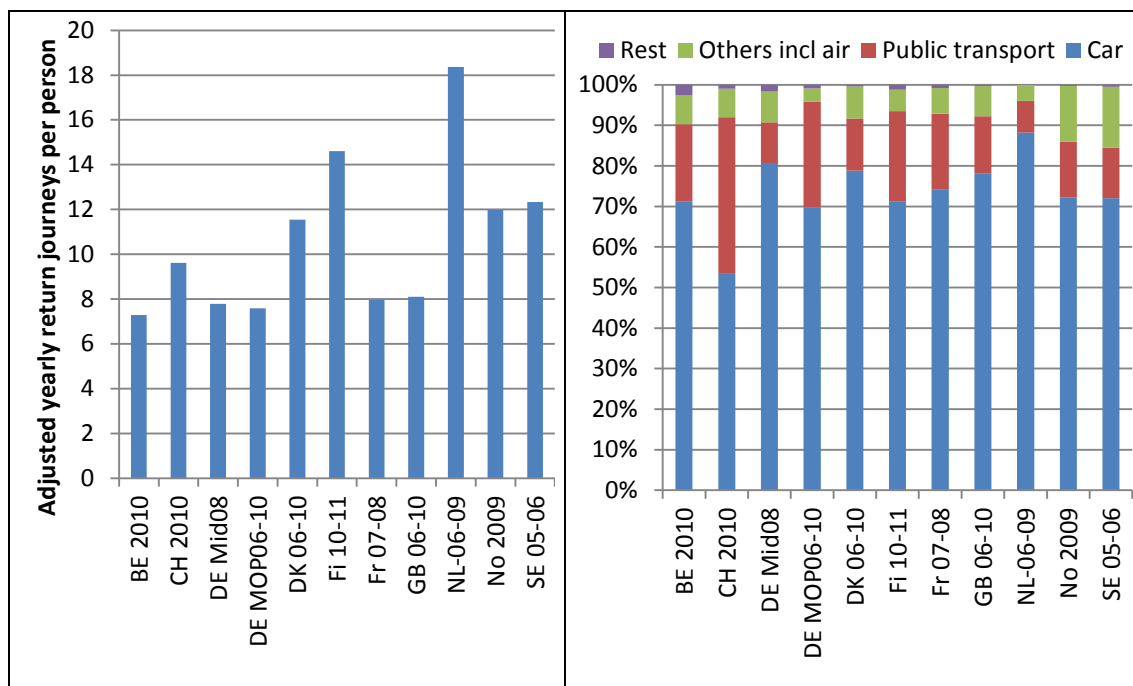


Figure 1 Yearly number of return journeys and mode share at journeys longer than 100 km. The country labels show the country and the year of data collection. For Germany the two surveys MiD and MOP are mentioned. Source: Look-up tables collected by the Cost Shanti group (Armoogum et al., 2014) and own calculations

(Armoogum et al., 2014; Christensen et al., 2014) compare travel activities based on ex-post harmonized data from 12 European daily NTS collected in the COST Shanti project. The collected look up-tables include NTS surveyed during the period 2005-2011 and the presented tables show the number of

trips per person travelling at the actual day and not per inhabitant because the share of travellers is differing between 6% and 28% which the authors believe is due to methodological differences and not really differences between the populations. Figure 1 shows the yearly number of return journeys longer than 100 km per person at 13-84 year and the mode share with an adjustment to 12% no-trip makers for all countries. The journey frequency varies between 8 and 18 with a maximum for the Netherlands, and Finland with 14, and Norway, Sweden and Denmark with 12 in the high end. The share of car travel varies between 54% for Switzerland and 88% for the Netherlands and the rest varying between 70% and 81%. For Switzerland the public transport share is 38% for the Netherlands only 8%. For the rest it is 10-26%. Interesting is the two sets of German figures; the trip frequency is very similar (8.6 and 8.8) but the public transport share is 26% for the MOP and 10% for the MiD. The mode 'other' includes air travel, tourist busses, lorries etc with air travel as the probably most important. This share is 12% for Norway and Sweden and 3-4% for the MOP and the Netherlands and 5-8% for the rest.

As part of the documentation of the Norwegian NTS information about long distance travel in Norway is reported (Vågane et al., 2011). According to this Norwegians above 12 years made 1.65 long distance one-way trips per person per month in 2009 (domestic trips longer than 100 km or trips abroad independent of length). The number has increased from 1.24 in 1998 and 1.35 in 2001 (22% increase in 2001-2009). The number corresponds to 9.9 return journeys per year (8.1 journeys in 2001 which was close to Sweden according to (Kuhnimhof et al., 2009)). 0.30 one-way trips per month were international trips in 2001 and in 2009 they amounted to 0.46 , i.e. an increase of 53%. The figures include short border crossing shopping trips to Sweden. Furthermore, overseas air travel is increasing rapidly (Denstadli & Rideng, 2012).

The share of travellers at distances over 100 km is higher than the average for men, people at 45-55 years-old, persons having high education, with a high income, leaders with a long workday, and residents in Oslo and suburbs. Holiday travel and visiting friends and relatives with at least 1 overnight stay and longer than 100 km represent 0.74 one-way journeys per month. The increase since 2001 is 19% close to the level of trips abroad. Interestingly a high share of the holiday travellers are women and people in the age group 45-66 years which are not the same as those making long distance trips in general. Long education, high household incomes and residents in Oslo and

suburbs are overrepresented with respect to all long distance travel over 100 km,

(Dargay & Clark, 2012) shows from the British long distance survey which includes domestic trips longer than 50 miles that women travel less than men, over-60s less than younger, people employed and students more than those without employment. Individuals in one adult households travel more than those in households with 2 adults and those again more than individuals in households with 3 or more adults. Families without children also travel more than those in families with children. Income is very important for the travel distance. Income elasticity is for all groups 0.5 but for air travel it is more than 1.0 and the same is the case for business trips by train. Those living in rural areas travel the longest distances and Londoners the shortest.

From the French NTS 2007-08 it is shown that motorization and having access to a second home is of importance for long distance travel (longer than 80 km). The more people in a household with cars the more they travel. A person in a three car household carries out 2.3 more long distance journeys than those living in non-motorized households. (Roux & Armoogum, 2014)

Long distance travel is very uneven distributed in the population. e.g., in France, 30% of long-distance trips are made by 5% of the population according to the 1992/93 NTS (Kuhnimhof et al., 2009). In the 2007/08 NTS the share of trips made by 5% has increased to 35%, and the most mobile 10% realize 50% of the overall journeys (Roux & Armoogum, 2014). Half of the respondent had no long distance travel during the last 3 month.

(Frändberg & Vilhelmson, 2011) show for Sweden that the number of domestic trips by air is not increasing whereas the purpose is changing from holiday and trips for visiting, which are decreasing, to business trips and long distance commuting. However, this is not due to less leisure travel; these trips are instead going abroad. The distance travelled abroad increased by 50% for from 1995 to 2006. And trips for holiday and visiting friends and relatives represent as for Norway more than half of the trips.

Based on former studies (Dargay & Clark, 2012) emphasize that income is an important factor for long distance travel measured as an event, for number of trips and for travel distance. Higher income people travel more irrespectively of purpose or mode. Large or complex family structure reduces most kinds of long distance travel especially by non-car based modes. They conclude that



females travel less than men, especially for commuting and business purposes.

In contrast to these studies (Frick & Grimm, 2014) conclude for a German study that travel at the mid-range distances of a few hundred kilometres will increase in importance compared to the stagnating daily travel. However, they find signs of stagnation when it comes to journeys longer than these, to very distant destinations. The trips which are increasing are long distance commuting and business trips undertaken in the context of everyday life. These trips are especially increasingly made by train and bus. The very long journeys which to a much higher extent are holiday travel has stagnated during the last ten years with regard to number of trips, average trip length and choice of transport mode. This is also underpinned by a very modest growth in income in Germany. Air traffic in Germany is growing; this however, is increasingly driven by incoming travellers from other regions of the world.

(Eugenio-Martin & Campos-Soria, 2013) is one of the few interesting studies not based on National datasets. They add aggregate data for the climate at the regional level and GDP at the national level to a micro dataset with outbound tourists from the 27 EU countries to analyse the effect of the economic crisis. The database includes gender, age, education, and employment. The authors show that the citizens are willing to travel longer (abroad instead of domestic) and are less inclined to reduce travel activities when they come from a region with bad climate than from a region with good climate. Citizens from a metropolitan region travel abroad more often than citizens from less urbanised and rural regions. This is explained by better access to travel infrastructure by the authors. Citizens from high income regions travel more often abroad and were less willing to change travel activity during 2009 than citizens from low income regions. During economic crises the domestic tourism increases, but less in regions with bad climate as in Denmark, and less in regions with high incomes. The size of a cutback during the crisis is unknown because the analysis is based on the stated information about the respondent's expectation and not the real reduction in travel activity in 2009 compared to 2008.

### **3. RESULTS FOR DANISH LONG DISTANCE TRAVEL**

#### **1.1. Data and definitions**

Long distance travel is, almost by nature, being both more time consuming and more expensive than short distance travel. Hence, long distance trips are

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less frequent and for most people not part of the daily life routines, such as commuting, shopping, regular leisure activities etc.

In this project it is found that an arbitrary limit for long distance travel is not related to the functionality of long distance travel. As the development of the transport system has increased travel speed and therefore trip length has increased too. It is plausible to assume that the length of a trip nowadays has to be longer to be perceived as a long trip than it had earlier. Instead a definition of long distance travel as infrequent journeys with an overnight stay is chosen for the project.

The analyses are based on two surveys. The two surveys are both retrospective surveys reporting journeys with overnight stay during the last 3 month, the TU 3-month Overnight Survey (TU-Survey) conducted for a year in 2010-11 by DTU Transport, and the above mentioned continuous Holiday and Business Travel Survey (HBS). Opposite to the HBS the TU-Survey includes detailed destination information which has made it possible to calculate distances on the network of the respective modes. For the HBS distances have only been calculated as a rough figure per country. The TU-Survey is unfortunately not including domestic journeys with only one overnight's stay.

## 1.2. Long distance travel in 2010-11

### Travel frequency and distance.

On average Danes had 5.5 low frequent travel activities with overnight stays per year in 2010-11. They are in average travelling 7,700 km corresponding to two yearly journeys to Rome.

Table 1 Number of journeys and travel distance at long distance travel per year per Dane for the age group 16-84 years to international and domestic destinations				
	1 (2) - 5 nights	6 or more nights	Second home	All journeys
International frequency	0.87 (16%)	0.79 (14%)	0.12 (2%)	1.79 (32%)
Domestic frequency	1.59 (29%)	0.28 (5%)	1.84 (33%)	3.86 (68%)
<b>All destinations frequency</b>	<b>2.46 (45%)</b>	<b>1.07 (20%)</b>	<b>1.95 (36%)</b>	<b>5.48 (100%)</b>
International distance	1,899 (24%)	4,787 (62%)	141 (2%)	6,818 (88%)
Domestic distance	565 (7%)	105 (1%)	283 (4%)	959 (12%)
<b>All destinations distance</b>	<b>2,442 (32%)</b>	<b>4,892 (63%)</b>	<b>4241 (5%)</b>	<b>7,724 (100%)</b>

Source: TU 3-month Overnight Survey

Roughly, one third of the trips are international, one third are trips to domestic second homes, and one third are other domestic trips (see Table 1). Holiday journeys and other long duration journeys (at least 6 nights) only represent

20% of the journeys of which three-fourths are to international destinations. Half of the journeys are short duration trips of which only one third are international. However, 90% of the mileage is bound for international destinations and nearly 2/3 is related to long duration journeys. Only 5% of the mileage represents trips to second homes of which 40% is for internationally located second homes.

Long distance travelling seems to be rather unevenly distributed on individuals. Only 51% of the population have had any kind of infrequent journeys the last 3 months and 25% have had more than one journey. 18% of the 16-84 years have had a long duration international journey and 15% have had a short duration international journey. In all 29% of the population travel international during 3 months. 21% of the respondents have had a short duration domestic journey and only 6% have had a long duration domestic journey.

10% of the population have at least 4 journeys and often 5, 6, 7 or more journeys. In all these 10% makes half (54%) of all journeys. 2% of the population travel at least 10 times per 3 month and accounts for 20% of all the travel activities with overnight stay. They travel in average once a week.

Only 12% of the respondents visit a domestic second home but those who do often visit it several times, 3.8 times each quarter on average.

In all 60% of the Danes between 16 and 84 year have travelled abroad during the last year. And further 18% have travelled one or two years earlier. ¾ of all Danes have been abroad with an overnight stay during the last 3 year. Only 2% of the Danes have never been outside Denmark with an overnight stay. For 8% it is more than 10 years since they have been abroad.

### **Travel purpose**

17% of the trips are for visits to friends and relatives and 70% of the trips are for holiday and other leisure activities of which half is spend in second homes (see Table 2).

The different types of travel are not distributed evenly on purpose. Only 10% are business and educational trips. However, they represent 19% of the international journeys and even 30% of the the short duration international journeys. 37% of the mileage at the short duration international journeys is for business and education. Only 6% of the domestic short duration trips are for

business or education. It should however be mentioned that this figure is underestimated because domestic trips with only one overnight's stay is not included in the survey.

**Table 2 Distribution of journeys on main travel purposes. For the sum is shown trips per person per year**

	International			Domestic			All trips
	short	Long	All	short	long	All	
Business and education	30%	7%	19%	6%	4%	6%	<b>10% - 0.56</b>
Holiday etc.	48%	81%	63%	17%	35%	20%	<b>34% - 1.87</b>
Vacation homes	9%	4%	7%	50%	44%	50%	<b>36% - 1.95</b>
Visiting friends and relatives	8%	8%	8%	22%	13%	21%	<b>17% - 0.93</b>
No information	5%	1%	3%	3%	4%	3%	<b>3% - 0.18</b>
<b>All types</b>	<b>100%-0.96</b>	<b>100%-0.82</b>	<b>100%-1.78</b>	<b>100%-3.20</b>	<b>100%-0.51</b>	<b>100%-3.71</b>	<b>100%-5.49</b>

Source: TU 3-month Overnight Survey

Holiday is dominating the international travel with 63% of the journeys and 70% of the kilometres. They even represent 81% of the long duration international journeys (79% of the kilometres). Holiday journeys only represent 20% of the domestic trips. Visiting friends and relatives is more usual for domestic trips, especially the short duration with 22% of all trips. However, 8% of the international trips are also for visiting friends and relatives. Visits to respondents vacation homes (owned and borrowed) represent half of all domestic journeys but only 7% of the international journeys.

## Travel mode

The main mode used to the destination is of course dependent on the travel type, see Table 3 for which visits to second homes are not included. Air plane is the dominating mode for international travel whereas car is the main mode for domestic travel for which plane is only used at 3% of the travel activities.

Public transport, mainly train, is used at one fourth of the domestic travel activities whereas it plays a minor role for the international travel. Train and coach serve about the same share at the international travel activities whereas coach is little used for domestic travel. 4% of the domestic journeys and 1% of the international ones are made by non-motorised modes. In most cases the use of these modes might probably be the purpose of the journey itself – to make a sailboat journey, a bike journey etc. The distribution on modes is the same for short and long duration domestic journeys. Short and long duration international journeys differ in mode choice first of all due to different destinations.

Table 3 Distribution of trips on the main mode for main travel types

	International		Domestic		All
	short	long	short	long	
Air plane	47%	62%	3%	1%	27%
Car	33%	27%	63%	64%	48%
Train	6%	3%	20%	20%	13%
Coach	6%	4%	1%	1%	3%
Bus and local train	2%	2%	3%	2%	3%
Walking, biking, sailboat	1%	1%	2%	4%	2%
Ferry	1%	1%	0%	1%	1%
No Information	5%	1%	7%	7%	5%
<b>All trips</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

Source: TU 3-month Overnight Survey

Business has a higher share of air travel than for private purposes with respect to both national and international journeys. For the domestic travel activities 11% of the business journeys go by air compared to 3% for all domestic journeys, and car is used for 66% compared to 48% for all domestic travel activities. Public transport is primarily used for visiting Danish friends and relatives (36% of the trips for visits); the same is the case with bike (6% of the trips for visits). Car is dominating for domestic holidays and other private purposes (81%) whereas public transport is only used for 14% of these trips.

For international travel, air is used for 66% of short duration business trips and 84% of the long duration business trips (85% respective 96% of the kilometres). For holiday travel as well as for visiting friends and relatives air travel is used for 40% of the short duration journeys. For long duration journeys air travel is used for 63% for holidays respective 73% for visits. Car is used for 39% / 43% of the short duration holiday / visiting trips and 28% / 22% of the long duration holiday / visiting trips.

91% of the long duration journeys by air are for private purposes. Only 26% of all international journeys by air are for business, and 20% of the mileage is for business.

Figure 2 shows how the travel frequency by car and public transport is decreasing by distance to the destinations in 100-km bands with a higher attraction to car than public transport. For air travel at the other hand there is no clear distance dependency.

Domestic travel is taking place at distances less than 500 km (for air travel less than 300 km due to the Danish geography). At these distances the frequency of public transport is independent of distance whereas it is

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decreasing by distance for car travel. For air travel the frequency is increasing by distance illustrating the competition between air and especially car travel at the longest distances in Denmark for which air travel furthermore has an advantage due to the shorter route across Kattegat.

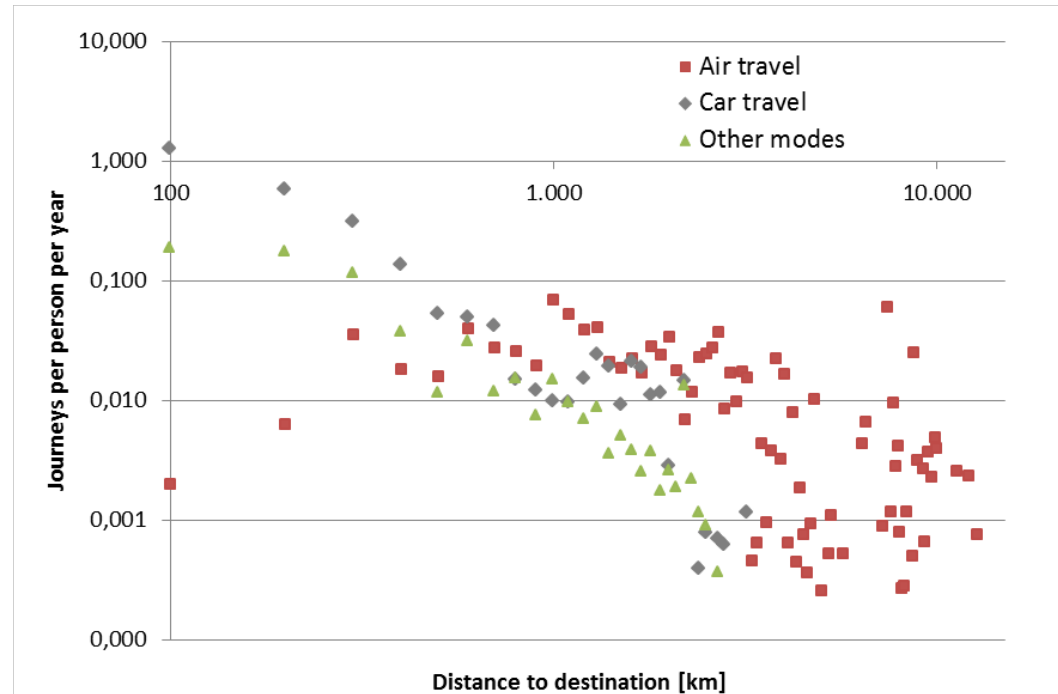


Figure 2 Travel frequency by the three main modes at long distance travel dependent on travel distance. Both distance and frequency is shown as log values. Source: TU 3-month Overnight Survey

At international destinations the travel frequency by car is decreasing up to distances at 1,000 km. Between 1,000 and 2,000 km the frequency is not decreasing for car whereas it is still decreasing log-linearly for public transport. For air travel the frequency is a little higher than for car whereas it seems to be at the same level or a little lower at distances less than 1,000 km.

Car is dominating for international travel at distances less than 500 km with public transport as a secondary possibility. From 500 km (Stockholm and Oslo for instance) there is a strong competition between all three modes up to 1,000 km (Paris, London, Basel, Budapest) from where public transport is getting less and less attractive whereas air travel and car is still competing up to 2,000 km (Rome). Air travel has a strong position relative to car for distances at 1,000-1,200 km representing several of the big cities and UK in general. For the mainland Europe to the south of Paris/Basel the competition between air and car is again fierce. Over 2,000 km air is more or less the only mode.

### 1.3. Travelling by population groups

The population groups are travelling quite differently, see Figure 3.

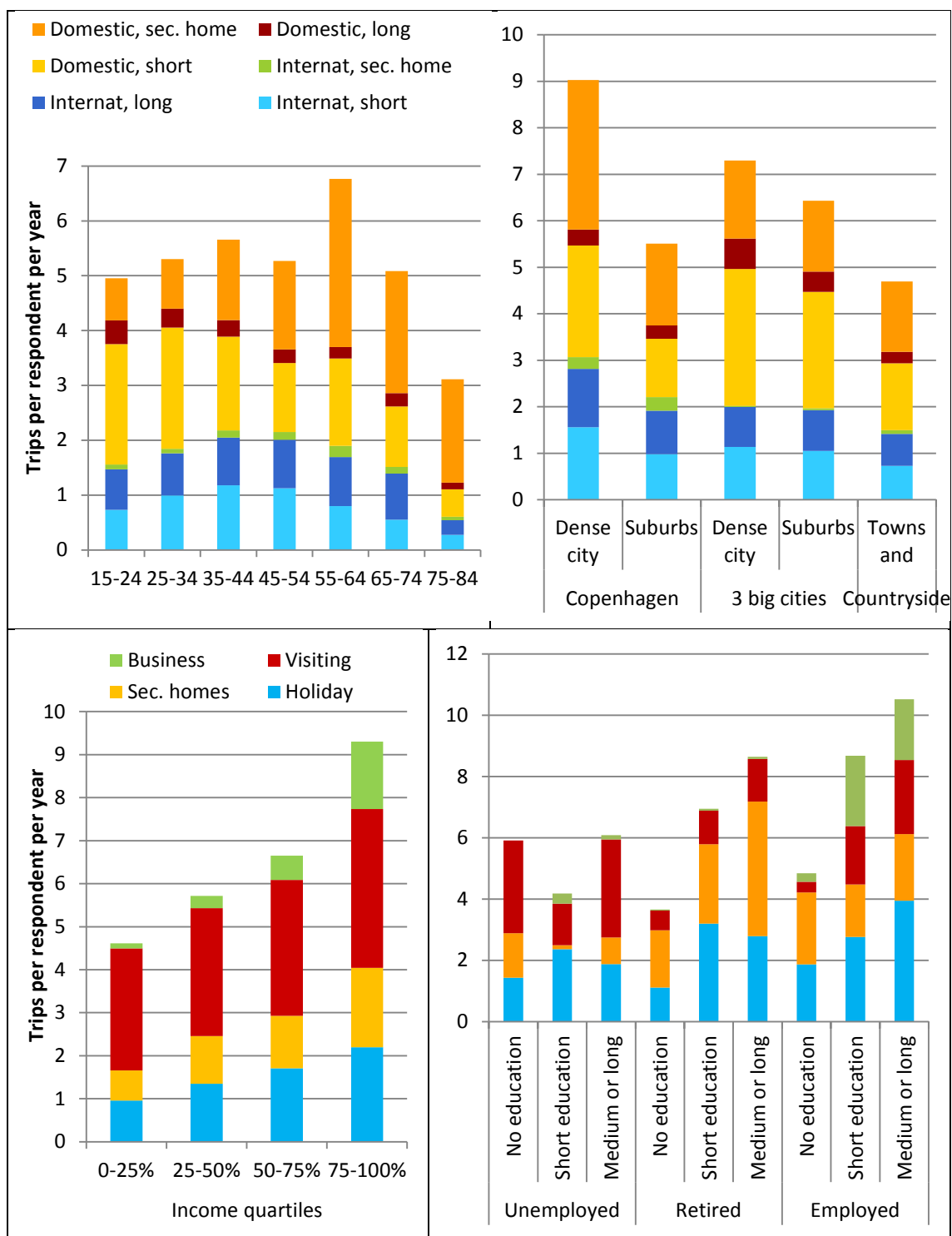


Figure 3 Travel frequency for different population groups shown for travel type at top and purpose in the bottom. Source: 3-month survey and HBS (to the bottom left)

Visits to vacation homes (second homes) is dominating for the age groups over 50 year, employed as well as retired, for the more wealthy and for people in Copenhagen, especially from the dense part of Copenhagen. Internationally located second homes are more or less only belonging to inhabitants in the Copenhagen area because the main part is houses in Southern Sweden. Vacation homes are owned by only 7% of the population (Skifter & Vacher, 2009) but they are used by a broader part of the population who borrows from family or friends or rent a house for a holiday.

All age groups travel at long duration international journeys at more or less the same frequency but the frequency is higher in Copenhagen than elsewhere and lowest outside the big cities. Short duration international trips are at the other hand more often conducted by the middle age-groups and people in Copenhagen. Instead the young and people outside Copenhagen are travelling more often in Denmark. The number of holiday journeys is clearly income dependent. They are more dependent on the educational level than on employment / retirement possibly because the well-educated also have a good income after retirement. It is first of all the unemployed who have less opportunity to travel. The lower income groups seem to partly compensate by having many visits to friends and relatives, this kind of trips being rather evenly distributed over income groups.

The retired and employed at the same educational level travel with a similar trip frequency for private purposes. The main difference is the choice of kind of holiday. The difference in travel frequency is due to business travel which the retired seldom perform. The unemployed also have business trips which are most important educational trips (or travel home in the weekend) because a main group of the unemployed with short or no education are students.

#### **1.4. Development in long distance travel**

The development in number of trips and mileage can be extracted from the Holiday and Business Travel Survey. Unfortunately the survey has changed substantially over the years which make comparisons across data collection brakes difficult. In the period 2004-2007 the survey was overloaded by a lot of detailed questions about the traveller's economic spending during each trip. The result was a response fatigue leading to a declaration of fewer trips than the correct. (Knudsen, 2015) assess the underrepresentation to be 16% for holiday journeys. Furthermore, from 2008 visits to friends and relatives were explicit mentioned in the questionnaire resulting in a substantial increase in



trips. Hence it is impossible to calculate a correct development in these travel types across the brake in 2008.

The number of journeys with overnight stays has increased by 2.9% p.a. and the kilometres by 4.2% p.a. in the seven years period from 2002/03 to 2009/10 when excluding visits to friends and relatives. The increase in long distance travel takes place for both car and air travel for which the yearly increase in mileage per capita is around 6% in the seven years period from 2002/03 to 2009/10 whereas public transport is decreasing by 1.8% p.a.

Table 4 Journeys per Dane per year and the average yearly increase from 1998 to 2010. Visits to friends and relatives are excluded					
	1998	2002	2006	2010	Change 1998-2010
Total journeys per Dane	2.92	2.57	2.71	3.53	1.6%
- Domestic	1.76	1.42	1.32	1.85	0.4%
- European	1.05	1.05	1.24	1.47	2.8%
- Non-European	0.11	0.10	0.14	0.22	5.6%
Holiday journeys per Dane	1.14	1.13	1.27	1.62	3.0%
- Domestic	0.46	0.43	0.40	0.45	- 0.3%
- European	0.61	0.64	0.79	1.02	4.4%
- Non-European	0.07	0.06	0.09	0.15	7.0%
Journeys to vacation homes per Dane	1.05	0.85	0.94	1.20	1.1%
- Domestic	0.89	0.66	0.70	1.09	1.7%
- European	0.15	0.18	0.22	0.11	- 2.5%
Business journeys per Dane	0.73	0.60	0.49	0.71	- 0.2%
- Domestic	0.40	0.34	0.22	0.31	- 2.1%
- European	0.29	0.23	0.23	0.33	1.1%
- Non-European	0.03	0.03	0.03	0.06	6.4%

Source: (Knudsen, 2015) developed from the Holiday and Business Travel Survey

Table 4 shows a smaller average yearly increase in number of trips (1.6%) from 1998 to 2010 due to stagnation in 1998-2002. However, the table gives an idea of the development in different travel purposes to different destinations (Knudsen, 2015). What is of special interest is more or less stagnation in number of business travel. For all kind of journeys except trips to vacation homes domestic travel has decreased and non-European travel has increased substantially. The development in holiday travel is in more details shown in Figure 4 in which the underestimation for the period 2004-07 is illustrated too (Knudsen, 2015). Stagnation in domestic journeys and increase in European and especially overseas travel is clearly illustrated.

Finally, in Figure 5 is shown the long term development in number of domestic and international holiday journeys with at least 4 night's overnight stay. The stagnating level of domestic travel can be observed back to the 1970'ies whereas the increasing international journeys dates further back. Public

transport played an important role for international travel in the 1980'ies. From the 1990'ies air travel has taken more and more over on behalf of first of all public transport but in the last period on behalf on car travel too.

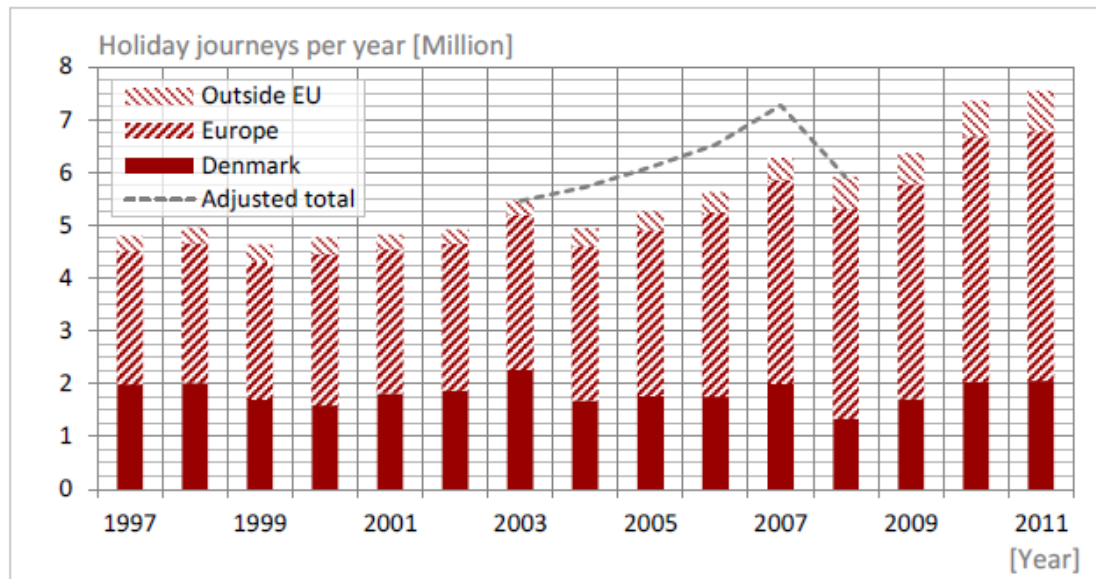


Figure 4 Number of holiday journeys per Dane at 15-84 year The adjusted total from 2004-07 illustrates the possible 16% underestimation from air travel. Source: (Knudsen, 2015) developed from HBS data

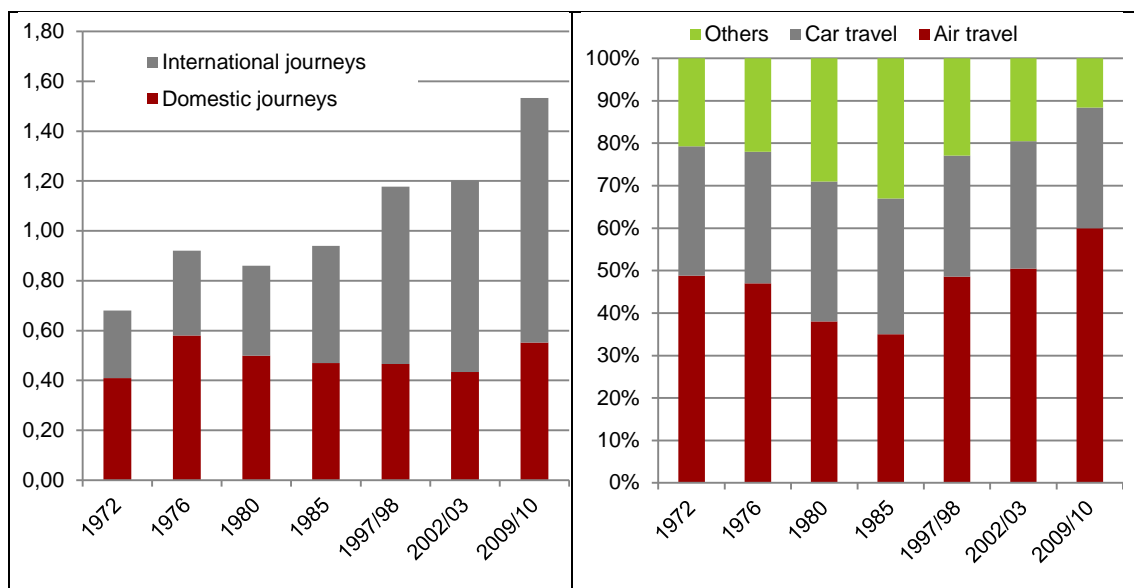


Figure 5 Number of holiday journeys with 4 and more overnight stays per Dane at 15-84 years (left). Mode share for the international part of these (right). Source: (Knudsen, 2015) developed from HBS data

The increase in long distance travel is most important driven by increase in income with an income elasticity well above 1. For air travel a panel analysis based on the two air travel databases has shown an income elasticity on number of trips around 2 and price elasticity at -0.35 - -0.40.

#### 4. DISCUSSION AND CONCLUSION

The results for long distance travel according to the European NTS show a big variation between the countries. For Norway and Sweden the number of yearly journeys are 12 which include both journeys under and over 400 km and therefore very similar to the figures reported by (Kuhnimhof et al., 2009) considering an increase from 2001 to 2006 respective 2009. The Norwegian number is a little higher than found by (Vågane et al., 2011) for long distance travel according to the retrospective survey (9.9 journeys). Considering a memory loss, which for the Danish survey is assessed to be 16% and from (Denstadli & Lian, 1998) more close to 30% the difference is not surprising. For Denmark the number of journeys is in line with Norway and Sweden. Finland is reporting a higher number. (Armoogum et al., 2014; Li. Christensen et al., 2014) however show that Finland has a higher number of long leisure trips especially in weekends which is in good accordance with the higher figure than the rest of the countries. The extremely high number of journeys by car in the Netherland could be related to the location close to the German city agglomeration along the Rhine and therefore more commuting from the eastern part of the country. Commuting to the Randstad is properly also increasing the number. A similar tendency should in this case have been expected for Belgium but is not the case. This might be related to quality problems with the survey (low response rate, very high share of no-trip respondents). The share of mileage for commuting is very high and indicates that the mileage at long commuting trips is high like in the Netherlands but a lot of long leisure trips might be missing.

What is very similar for the different studies is that income increases the travel activity substantially. Income is also shown to be an important driver of the development in long distance travelling.

Except for the British study the rest of the studies mention a higher long distance travel activity in the big cities than in the rest of the countries and especially in the rural areas. The reason why the British study show a lower travel activity for Londoners might be related to the definition of long distance travel by the distance threshold at 50 miles. Commuting and daily leisure activity is known to be shorter in the big cities and very high from rural areas. This is possibly why the Londoners are travelling less. The missing international journeys is possibly another explanation. This can also be seen from the Swedish study which confirms that the international trips are increasing.

The French and the Danish study shows an accordance about a very uneven distribution of long distance travel with half of the population not travelling during the 3-month period and with 10% having undertaken half of all the journeys. A non-negligible share of the Danish adults has in fact never been travelling internationally.

People travelling very often are properly often travelling for business. The survey methodology is important to catch the journeys from this group because they are more difficult to reach when they are away once a week in average. Furthermore the results might easily be affected by response fatigue when asking for all travel 3 month back in time. Their travel activity might therefore very well be even higher than reported. The Danish survey has an upper limit for the number of trips which details are asked for which reduces this problem.

People not travelling much or never is often elderly people who are no longer able to or no more interested in travelling ('we have travelled/seen enough in our life'). Another group is the low-income groups. For Denmark it is observed that low-income groups and people outside the labour market (not only retired) more often visits friends and relatives and travel less for holidays. This can be seen as a strategy to get a holiday for people with few resources.

Another interesting result is that domestic travel is not the preferred way to spend a holiday for Danes, in fact only 20% of the long duration holidays are spent in Denmark and only 23% of the domestic holidays are long duration (a week or more). This is in accordance with the analyses from (Eugenio-Martin & Campos-Soria, 2010, 2013) who show that people from countries or regions with a cold climate travel more abroad than those living in warmer countries.

This fact is also affecting the development in travel activities and the related environmental burden. As it is shown for Denmark the overseas journeys are increasing much faster than the European and the domestic are stagnating.

If you should look to a more sustainable holiday activity one of the interests should be oriented against the domestic vacation homes. They already play an important role for the Dane's holiday activity with 1.84 trips per respondent of the overall 3.82 holiday trips. However, they are owned by a small share of the population with a high share from 50 year and up. Young people are not using vacation homes very much. At the other hand the vacation homes are also often borrowed from friends and family or rented. Today a migration away from rural areas and villages is taking place all over the country. Ideas to

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develop left houses in nice villages as vacation homes for rent could be a possibility.

The analyses of mode share at different distances shows strength of the car at the middle distances compared to both public transport and air travel. This is properly due to the possibility to carry more passengers for the same price and the distance still being inside one to two driving days. Public transport is able to compete up to 1,000 km due to a little higher travel speed to the big cities and around the same price for 1-2 passengers. Up to 1,000 km air travel is faster but only cheaper than car for one passenger. This is also resulting in a higher share of air travel for business travellers.

Finally, we should point to the fact that only 26% of the journeys and 20% of the mileage at international journeys by air from Denmark are for business. This is explaining the success for the low cost airlines. The flag carriers have too long been focusing on business travellers and high income tourist travellers instead of the big group of middle-class tourists in their price policy and marketing. Just read the flight-magazines, they are not for middle-class tourists. But this is about to change now – finally. However, it should be mentioned that the share of business travellers is underestimated due to the missing same-day travellers. They are possibly adding 5-10% journeys to the business travellers. In middle Europe they represent a higher share than in the Nordic countries due to the longer travelling times and need to change flight for many destinations.

The three Nordic studies (Denmark, Norway, and Sweden) show a stagnating number of domestic trips and an increasing international travel. For Norway and Sweden is observed a change from domestic holiday to long distance commuting and business travel. Due to another definition of long distance travel the increase in long commuting trips is not a part of the Danish study, but stagnation especially in holiday travel is observed too. For Germany and Great Britain the increase in commuting over 100 km is observed too. However, the German study suggests stagnation in international long distance travel which cannot be observed in the Nordic studies. This part of the German study is based on small figures and should be investigated deeper.

In general further studies of the nature of the development in international long distance travel is important. It is known that air travel in Europe is increasing rapidly. But to conclude that the increasing number of passengers is generated by 'the others' as the German study does is not a satisfying

approach. It is needed to know more about the nature of changes in demand for air and road travel. We cannot do with 3 Nordic studies if a more sustainable development should be developed.

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